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Regeneration of Clipped Subcaudal Scales in a Pilot Black Snake

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The method of marking snakes by clipping subcaudal scales, devised and practiced by the late Frank N. Blanchard (Blanchard and Finster, 1933), has been widely employed by herpetologists. It is easy, quick, and, if a simple code is followed, future identification of individual specimens may be made with accuracy. Most clipping has been done among local populations, the snakes being liberated after marking; many have been recovered at later dates and a number of results have been published upon data gleaned from such experiments. These have added much to our knowledge on such subjects as rates of growth, wanderings, homing, and duration of life.

The success of all the investigations depends upon the retention of the scars resulting from the clippings, although many persons also record abnormalities or natural scars and rely upon these to help clinch recognition. The longest period of time reported between marking and later recapture is thirteen years. This was for a male *Diadophis p. edwardsii* from northern Michigan (Gilreath and Blanchard, 1947, p. 2). This snake, originally marked in 1932, was recovered in seven different seasons, the last time in 1945. The same authors mention another *Diadophis* that was caught in each of six consecutive years. Most published records for other snakes are for much shorter times not more than two or three years.

The scars may not be permanent in every case, however. Regeneration may take place, thus obliterating or partially obscuring the original marks and making identification difficult or even impossible. At least, that is the case with a large female *Elaphe o. obsoleta* (now 1540 mm. in length) that has been in captivity in the Philadelphia Zoological Garden for nearly five years. Snakes on exhibition that have scientific value and are destined for later preservation are, as a matter of routine, clipped and coded for future recognition. The specimen in question was collected 5 miles east of Blackstone, Nottoway County, Virginia, on April 25, 1943, by Frederick A. Ulmer, Jr. When re-

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ceived at the Garden a few days later its subcaudals, numbers 2, 4 and 7 on the left side, were clipped, large triangular segments of skin being excised clear down to the muscle layer. Because the snake obviously would soon deposit eggs (11 were laid on July 9, 1943) it was placed in a cage by itself and has continued to live alone ever since. It is still in excellent health and condition.

By the end of two years all the marks were still plainly visible, but at three years the replacement of tissue had progressed so far that close examination was necessary to be certain which scales had been involved. After four years, regeneration was such that identification would have been virtually impossible if the snake had not been kept isolated. As this is written (after almost five years) the seventh scale is still partially indented, but one could not be too certain about the second scale; the fourth one has become as large as uncut subcaudals, and, although its posterior margin is slightly irregular, it is no more so than that of some of the other scales which were not clipped. If this snake had been liberated and then recovered at the end of four or more years, I certainly could not be sure of its identity.

LITERATURE CITED

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